## IN THE CLAIMS

Please amend the claims as indicated:

1. (currently amended) A logging tool conveyed in a borehole for nuclear magnetic resonance (NMR) logging of an earth formation comprising:

(a) a housing defining a longitudinal axis of the tool;

(b) at least one sensor assembly coupled to the housing by a coupling device, a body of said at least one sensor assembly capable of being close to a wall of a borehole in the earth formation, said sensor assembly including

(A) a magnet ~~for providing~~ which provides a static magnetic field in a sensitive region in said formation,

(B) a transmitter coil ~~for producing~~ which produces a pulsed radio frequency (RF) magnetic field in said sensitive region, and,

(C) at least one receiver coil ~~for receiving~~ which receives signals from nuclei in said sensitive region, said at least one receiver coil having an axis substantially parallel to an axis of said transmitter coil

wherein an axial extent of the transmitter coil is greater than an axial extent of the at least one receiver coil.

2. (original) The logging tool of claim 1 wherein said at least one sensor assembly further comprises a plurality of sensor assemblies circumferentially distributed

about said housing.

3. (previously presented) The logging tool of claim 1 wherein said coupling device is operated by one of (i) a spring, (ii) hydraulic power, and, (iii) electrical power.

4. (original) The logging tool of claim 1 wherein said magnet is a U-shaped magnet and further comprises:

(i) a first magnet and a second magnet having a magnetization direction perpendicular to said longitudinal axis of the tool comprising arms of the U, said first and second magnets having opposite directions of magnetization, and

(ii) a magnetically permeable yoke forming the base of the U.

5. (original) The logging tool of claim 1 wherein said RF magnetic field is produced by activating the transmitter coil with one of (i) a CPMG sequence, and, (ii) a modified CPMG sequence having a refocusing angle less than $180^0$.

6. **canceled**

7. (original) The logging tool of claim 1 wherein the at least one receiver coil further comprises at least two receiver coils offset along the longitudinal axis.

8. (currently amended) The logging tool of claim 1 further comprising a field shifting electromagnet including a coil ~~for adjusting~~ which adjusts a position of the sensitive region.

9. (original) The logging tool of claim 1 wherein the at least one receiver coil is displaced towards the borehole wall from the transmitter coil

10. canceled

11. (original) The logging tool of claim 4 wherein a gap between ends of the first and second magnet away from the yoke is adjustable.

12. (currently amended) The logging tool of claim 1 further comprising a processor ~~for using~~ which determines from the signals from the at least one receiver coil ~~for determining~~ a parameter of interest of the earth formation.

13. (previously presented) The logging tool of claim 7 further comprising a processor for using the signals from the at least two receiver coils for determining a parameter of interest of the earth formation.

14. (original) The logging tool of claim 12 wherein the parameter of interest is at least one of (i) clay bound water, and, (ii) bulk volume irreducible.

15. (currently amended) A sensor assembly for nuclear magnetic resonance (NMR) measurements from a medium comprising:

(a) a U-shaped magnet including a pair of magnets having opposed magnetization coupled by a permeable yoke ~~for~~ providing a static magnetic field in a sensitive region in the medium;

(b) a transmitter coil ~~for~~ producing a pulsed radio frequency (RF) magnetic field in said sensitive region; and,

(c) at least ~~one receiver coil~~ two spaced apart receiver coils which receive ~~for receiving~~ signals from nuclei in said sensitive region, said at least ~~one~~ two receiver ~~coil~~ coils having ~~an axis~~ axes substantially parallel to an axis of said transmitter coil.

16. (original) The sensor assembly of claim 15 wherein said RF magnetic field is produced by activating the transmitter coil with one of (i) a CPMG sequence, and, (ii) a modified CPMG sequence having a refocusing angle less than $180^0$.

17. **canceled**

18. (currently amended) The sensor assembly of claim 15 further comprising a field shifting electromagnet including a coil ~~for adjusting~~ which adjusts a position of the sensitive region.

19. (original) The sensor assembly of claim 15 wherein said transmitter coil is positioned between the at least one receiver coil and the permeable yoke.

20. (original) The sensor assembly of claim 15 wherein a gap between ends of the first and second magnet away from the yoke is adjustable.

21. (currently amended) The sensor assembly of claim 15 further comprising a processor ~~for using~~ which determines from the signals from the at least ~~one~~ two receiver ~~coil~~ coils ~~for determining~~ a parameter of interest of the earth formation.

22. canceled

23. (previously presented)A method of determining a parameter of interest of an earth formation comprising:

(a) conveying a logging tool having a longitudinal axis in a borehole in the earth formation;

(b) using a U-shaped magnet on at least one sensor assembly for producing a static magnetic field in a sensitive region in said formation, said at least one sensor assembly coupled to a housing of the logging tool by an coupling device;

(b) using a transmitter coil on the at least one sensor assembly for producing a pulsed radio frequency (RF) magnetic field in said sensitive region; and,

(c) using at least one receiver coil on the at least one sensor assembly for receiving signals from nuclei in said sensitive region, said at least one receiver coil having an axis substantially parallel to an axis of said transmitter coil.

24. (original) The method of claim 23 wherein said at least one sensor assembly further comprises a plurality of sensor assemblies circumferentially distributed about said housing; the method further comprising obtaining information about an azimuthal variation of said parameter of interest.

25. (previously presented) The method of claim 23 further comprising operating the coupling device by one of (i) a spring, (ii) hydraulic power, and, (iii) electrical power.

26. (original) The method of claim 23 wherein said U-shaped magnet further comprises:

(i) a first magnet and a second magnet having a magnetization direction perpendicular to said longitudinal axis of the tool comprising arms of the U, said first and second magnets having opposite directions of magnetization, and

(ii) a magnetically permeable yoke forming the base of the U.

27. (original) The method of claim 23 wherein producing said pulsed RF magnetic field further comprises modulating a RF signal by one of (i) a CPMG sequence, and, (ii) a modified CPMG sequence having a refocusing angle less than $180^0$.

28. (original) The method of claim 23 wherein said RF magnetic field has a field direction substantially orthogonal to said longitudinal axis and to a direction of the static magnetic field in said sensitive volume.

29. (original) The method of claim 23 wherein the at least one receiver coil further comprises at least two receiver coils offset along the longitudinal axis.

30. (original) The method of claim 23 further comprising using a field shifting electromagnet including a coil for adjusting a position of the sensitive region in the formation.

31. (original) The method of claim 23 wherein the transmitter coil has a greater length along the longitudinal axis than the at least one receiver coil, the method further comprising moving the logging tool along the longitudinal axis while making continuing measurements.

32. (original) The method of claim 23 further comprising adjusting a gap between ends of the first and second magnet away from the yoke and adjusting a position of the sensitive region.

33. (previously presented) The method of claim 23 further comprising using a processor for determining from the signals from the at least one receiver coil the parameter of interest of the earth formation.

34. (previously presented) The method of claim 29 further comprising using a processor for determining from the signals from the at least two receiver coils the parameter of interest of the earth formation.

35. (original) The method of claim 23 wherein the parameter of interest comprises at least one of (i) clay bound water, and, (ii) bulk volume irreducible.

36. (original) The method of claim 24 wherein the plurality of sensor assemblies comprises three, and wherein the parameter of interest comprises bound volume irreducible, the method further comprising determining a dip and azimuthal direction of the formation.

37. (previously presented) The method of claim 24 wherein the plurality of sensor assemblies comprises three, and wherein the parameter of interest comprises clay

bound water, the method further comprising determining a dip and azimuthal orientation of shale laminations.

38. (original) The method of claim 24 wherein the plurality of sensor assemblies comprises three and wherein the parameter of interest comprises clay bound water and bulk volume irreducible, the method further comprising determining dip and cross-bedding of the formation.

39. (original) The method of claim 30 further comprising repeating steps (a) - (c) for a different positions of the sensitive region using a phase alternated pulse sequence.

40. (original) The method of claim 35 wherein producing said pulsed RF magnetic field further comprises modulating a RF signal with a modulating signal that is one of (A) a CPMG sequence, and, (B) a modified CPMG sequence having a refocusing angle less than $180^0$.

41. (original) The method of claim 40 wherein said modulating signal includes short interecho spacings for determining a rapidly decaying component of a $T_2$ distribution.

42. (currently amended) A method of determining a parameter of interest of a medium comprising:

(a) using a U-shaped magnet including a pair of magnets with opposed polarization coupled by a magnetically permeable yoke for producing a static magnetic field in a sensitive region in the medium;

(b) using a transmitter coil for producing a pulsed radio frequency (RF) magnetic field in said sensitive region; and,

(c) using at least ~~one receiver coil~~ two receiver coils having ~~an axis~~ axes substantially parallel to an axis of said transmitter coil for receiving signals from nuclei in said sensitive region.

43. (original) The method of claim 42 wherein producing said pulsed RF magnetic field further comprises modulating a RF signal by one of (i) a CPMG sequence, and, (ii) a modified CPMG sequence having a refocusing angle less than $180^0$.

44. (original) The method of claim 42 wherein said RF magnetic field has a field direction substantially orthogonal to said longitudinal axis and to a direction of the static magnetic field in said sensitive volume.

45. **canceled**

46. (original) The method of claim 42 further comprising using a field shifting electromagnet including a coil for adjusting a position of the sensitive region in the formation.

47. (original) The method of claim 42 further comprising adjusting a gap between ends of the first and second magnet away from the yoke and adjusting a position of the sensitive region.

48. (currently amended) The method of claim 42 further comprising using a processor for determining from the signals from the at least ~~one~~ two receiver ~~coil~~ coils the parameter of interest of the earth formation.

49. (original ) The method of claim 46 further comprising repeating steps (a) - (c) for a different position of the sensitive region using a phase alternated pulse sequence.

50. **canceled**

51. **canceled**

52. (previously presented) The logging tool of claim 7 wherein said at least one sensor assembly is adapted to be rotated to a position wherein said at least two receiver coils are at substantially the same longitudinal position

53. (previously presented) The method of claim 29 further comprising:

(i) rotating said sensor assembly to position said at least two receiver coils at substantially the same longitudinal position; and

(ii) obtaining said signals with an increased azimuthal resolution.

54. (previously presented) The logging tool of claim 1 wherein said magnet has a higher magnetization at an end than at a middle portion of said magnet.

55. (new) A sensor assembly for nuclear magnetic resonance (NMR) measurements from a medium comprising:

(a) a U-shaped magnet including a pair of magnets having opposed magnetization coupled by a permeable yoke which provides a static magnetic field in a sensitive region in the medium;

(b) a transmitter coil producing a pulsed radio frequency (RF) magnetic field in said sensitive region;

(c) a field shifting magnet which alters a position of the sensitive region; and,

(d) at least one receiver coil for receiving signals from nuclei in said sensitive region, said at least one receiver coil having an axis substantially parallel to an axis of said transmitter coil.

56. A method of determining a parameter of interest of a medium comprising:

(a) using a U-shaped magnet including a pair of magnets with opposed polarization coupled by a magnetically permeable yoke for producing a static magnetic field in a sensitive region in the medium;

(b) using a transmitter coil for producing a pulsed radio frequency (RF) magnetic field in said sensitive region;

(c) using a field shifting magnet to alter a position of the sensitive region; and,

(d) using at least one receiver coil having an axis substantially parallel to an axis of said transmitter coil for receiving signals from nuclei in said sensitive region.